

Amendments to the Specification

Please replace the Title beginning at page 1, line 4, with the following amended Title:

METHODS FOR PRODUCING MICROCHANNEL CHIPS, MICROCHANNEL CHIPS, METHODS FOR SEPARATING BIOMOLECULES USING THE MICROCHANNEL CHIPS, AND ELECTROPHORETIC APPARATUS HAVING THE MICROCHANNEL CHIPS MICRO-FLOW CHANNEL CHIP PRODUCING METHOD, MICRO-FLOW CHANNEL CHIP, METHOD OF SEPARATING BIOMOLECULES USING SUCH MICRO-FLOW CHANNEL CHIP, AND ELECTROPHORESIS DEVICE HAVING SUCH MICRO-FLOW CHANNEL CHIP

Please insert the following new paragraph on page 1 at the next line below the Title:

This application is a national stage application under 35 U.S.C. § 371 from PCT Application No. PCT/JP2005/003604, filed March 3, 2005, which claims the priority benefit of Japanese Application No. JP 2004-060215, filed March 4, 2004, which is hereby incorporated by reference in its entirety.

Please replace the paragraph beginning on page 2, line 36 and ending at page 5, line 9 with the following replacement paragraph:

The present inventors conducted dedicated studies to achieve the objective described above, and discovered that the processes described below can improve adhesive strength when laminating cover materials to substrates. The inventors also discovered that convenient methods for producing microchannel chips can be provided, and thus completed the present invention. Specifically, the present invention includes the following:

[1] a method for producing a microchannel chip, comprising the steps of:

- a) shielding a surface of a substrate, on which a groove-like channel has been formed, with a mask that exposes the channel,
- b) forming a polymer membrane on the exposed surface of the substrate; and
- c) laminating a cover material on to the substrate surface on which the channel has been formed;

[2] the method of [1], comprising the step of forming a polymer membrane on the side of the cover material surface that will be laminated to the substrate;

[3] the method for producing the microchannel chip of [2], wherein when a polymer membrane is formed on the side of the cover material surface that will be laminated to the substrate, the polymer membrane is formed on an exposed surface of the cover material by shielding the cover material surface with a mask, the exposed area of which is partially or entirely identical in shape to the mask for the substrate;

[4] the method of any one of [1] to [3], wherein the polymer membrane on the substrate surface is:

- (a) a plasma-polymerized membrane formed by plasma polymerizing a plasma-polymerizable monomer on the substrate surface,
- (b) a surface-polymerized membrane formed by polymerizing a polymerizable monomer on the substrate surface, or
- (c) a polymer-bound membrane formed by binding a polymer compound onto the substrate surface;

[5] the method of any one of [1] to [4], wherein the polymer membrane on the substrate surface is a plasma-polymerized membrane;

[6] the method of any one of [2] to [5], wherein the polymer membrane on the cover material surface is:

- (a) a plasma-polymerized membrane formed by plasma polymerizing a plasma-polymerizable monomer on the ~~substrate surface~~ cover material,
- (b) a surface-polymerized membrane formed by polymerizing a polymerizable monomer on the ~~substrate surface~~ cover material, or
- (c) a polymer-bound membrane formed by binding a polymer compound onto the ~~substrate surface~~ cover material;

[7] the method of any one of [2] to [6], wherein the polymer membrane on the cover material surface is a plasma-polymerized membrane;

[8] the method of any one of [2] to [7], wherein the polymer membrane formed on the substrate surface and the polymer membrane formed on the cover material surface are identical polymer membranes;

[9] the method of any one of [1] to [8], wherein the lamination is performed by pressure bonding or thermocompression bonding;

[10] the method of any one of [1] to [9], wherein at least either one of the substrate or the cover material is a plastic;

[11] the method of any one of [1] to [10], wherein the substrate and the cover material are plastics;

[12] the method of [11], wherein both the substrate and the cover material are a thermoplastic resin, and the laminating process comprises a method in which the substrate and the cover material are attached by thermocompression bonding;

[13] the method of [12], wherein thermocompression bonding is performed at 200°C or less;

[14] the method of [10], wherein one of the substrate or the cover material is a silicon resin, and the other is a glass or a plastic, and the laminating process comprises a method in which the substrate and the cover material are attached by pressure bonding;

[15] the method of any one of [1] to [14], wherein the mask is either a photoresist-mask or a metal mask;

[16] a microchannel chip made by laminating a cover material to a channel-side surface of a substrate on which a channel has been formed, wherein a part or the entire surface of the channel on the substrate surface is coated with a polymer membrane;

[17] the microchannel chip of [16], wherein the substrate-side surface of the cover material is coated with a polymer membrane;

[18] the microchannel chip of [17], wherein an area on the substrate-side surface of the cover material, which is opposite an area of the substrate on which a polymer membrane is formed, is coated with a polymer membrane partially or entirely identical in shape to that on the part of the substrate on which polymer membrane is formed;

[19] a method for separating biomolecules, comprising the steps of:

- a) adding a biomolecule to be analyzed to a microchannel chip made by laminating a cover material to a channel-side surface of a substrate on which a channel has been formed, and coating a surface of the channel on the substrate surface with a polymer membrane; and
- b) applying a separation pressure to a separating medium;

[20] the method of [19], wherein the separation pressure is provided by electrophoresis;

[21] the method of [20], wherein the electrophoresis is capillary electrophoresis;

[22] the method of any one of [19] to [21], wherein the biomolecule is a protein; and

[23] an apparatus for electrophoretic analysis comprising the following components:

- a) a microchannel chip made by laminating a cover material to a channel-side surface of a substrate on which a channel has been formed, and coating a surface of the channel on the substrate surface with a polymer membrane,
- b) a support used to retain the microchannel chip, and
- c) electrodes used to apply a voltage to the microchannel chip retained by the support.

Please replace the paragraph beginning on page 6, line 32 and ending on page 7, line 2 with the following replacement paragraph:

Preferably, the polymer membranes formed on the above cover material surfaces are any one of:

- (a) plasma-polymerized membranes formed by plasma polymerizing plasma-polymerizable monomers on ~~substrate surfaces~~ cover materials,
- (b) surface-polymerized membranes formed by polymerizing polymerizable monomers on ~~substrate surfaces~~ cover materials, or
- (c) polymer-bound membranes formed by binding polymer compounds onto ~~substrate surfaces~~ cover materials.